Patent Application by

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TITLE: AQUATIC WEED SUPPRESSOR

CROSS REFERENCE TO RELATED APPLICATIONS

Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

There was no Federal support for this research or development.

BACKGROUND - FIELD OF INVENTION

This invention is in the field of the suppression of sub-surface aquatic weed growth.

BACKGROUND - DESCRIPTION OF PRIOR ART

Some relative patents:

4056936	Nov 1977	Mayer	405/302.7
4518280	May 1985	Fletcher	405/17
4577996	Mar 1986	Elias, Fletcher	405/17

The problem with weed infestation in relatively shallow (eight feet or less) bodies of water whether they be ponds, lakes, canals, irrigation ditches, or tidal areas has been increasingly obvious. (See: Michigan State University manual E-2437 issued 12/98 titled "Aquatic Pest Management" with particular reference to Chapter 6. Another relative article can be found at "www.Army.mil/el/aqua/apis/mechanical/eurasian.html).The condition is evident in almost any

aquatic environment where there is relatively slow movement of the water. Aquatic weed growth has a deleterious effect on aquatic activities and can be a health hazard. If permitted unchecked the ultimate result of aquatic weed growth is the transformation of the body of water into swamp and eventually into great farm land. The relatively recent introduction of Eurasian Milfoil into the US Northeast's aquatic ecosystem has been a disaster. Some idea of the costs relating to the control of aquatic weeds can be gleaned from a report of the projects funded by the State of Washington under their Aquatic Weeds Program for the period 1994 to 2000 found at site:

"www.ecy.gov/programs/wq/plants/grants/projects.html"

A review of the literature indicates that many solutions have been proffered:

1) Mostly they involve the repeated use of chemical agents. The EPA's interest in these chemical treatments has tended to limit their use and effectiveness and the repeated applications are costly.

2) Another proffered solution is the mechanical removal by cutting or pulling out the objectionable weeds. The required continuous application of such procedures, their labor intensive nature, and the problems with the disposal of the removed material have limited the use of these techniques.

3) Yet another solution is the lowering of the body of water in the Fall of the year and trusting in mother nature to kill the weeds and their seeds. This requires a significant lowering of the water level through a period of deep freezing and has proven to be only a slight mitigator of the problem in the next season. Also most affected bodies of water can not be lowered adequately or there is not the potential for deep freezing. And, the most serious objection to this solution, the surviving weeds are generally the naiads and the Eurasian Milfoil - the major problems.

4) Another proffered solution is the covering of the soil below the water with a shield of some sort to stop the sun's rays from stimulating weed growth. The trick here is to keep the cover, usually a plastic film or screen, down on the ground below the water while permitting the gases resulting from decomposition to escape.

5) Another solution is the introduction of grass eating fish. The down sides here include the fact that these particular fish prefer other weeds than Eurasian Milfoil and therefore remove the desirable weeds before attacking the problem weeds and the need to feed the fish after the weeds are eaten.

6) The solution theoretically most acceptable is the deepening of the water to the point where inadequate sunlight gets to the aquatic substrate to foster the growth of weeds or when weeds grow they do not reach the surface of the water. In most instances this is not a practical solution.

After years of involvement in the aquatic weed problem as relates to fresh water lakes, I have finally identified a solution which is economical, easy to install and does the job. This is the subject of this disclosure.

SUMMARY OF INVENTION

A means of blocking the sun's rays so that they do not stimulate aquatic plant growth by covering the substrate with an opaque film, said film being held to the substrate by heavier than water "bars" either integral with the film, attached to the film, or otherwise positioned on the film in a configuration that causes the gases of decomposition to migrate to sections of the film where there have been located gas release ports.

OBJECTS AND ADVANTAGES

The several objects and advantages of this invention are:

a) The prevention of the growth of submersed aquatic weeds by restricting sunlight reaching the aquatic substrate.

b) Integral with the barrier is the means to keep the sunlight-blocking means in place on the aquatic bed; there is no need to add rocks or other weights.

c) The gases of decomposition at the substrate readily escape the sunlight barrier by being directed to exhaust ports by the hold down means.

d) The barrier can be placed at any time, even when the weeds are in full growth and in any depth of water without anyone necessarily going into the water.

e) The life expectancy of this devise in lake water conditions is limited only by the degradation of the barrier by sunlight or the accumulation of sediment on the barrier; the first of which is reduced by the selection of barrier material and the light filtering effect of water and the second by the design of the devise.

f) Because of its simplicity, the use of inexpensive materials, its ease of installation, and its relatively long life, this weed suppression system is far and away the most cost effective and environmental friendly of all the weed suppression or removal systems available at this time.

The key novelty in this invention is a hold down means integral with a relatively opaque sheet; this hold down means is positioned so as to direct gases of decomposition to release ports cut in the sheet with the result that the sunlight blocking means stays on the substrate and weed growth is terminated.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1. Is a view of the aquatic weed suppressor in position on the bottom of a body of water.

Figure 2. Is a view of the aquatic weed suppressor as it would be positioned in an irrigation ditch.

DISCUSSION OF INVENTION

Bearing in mind that the objective is to stop the growth of objectionable weeds (2) in aquatic environments inexpensively and with no environmental damage I propose this simple device consisting of a strip of plastic sheeting (5) of whatever width and length is appropriate for manufacture and use with multiple laterally oriented weights (4) appropriate for holding the sheet to the substrate (1) and with decomposition gas (11) emission ports (6, 7, 8 or 9) in the sheet midway between the hold down means.

The ideal sheet material is one with a specific gravity of less than one. Material cost and buoyancy considerations encourage the use of the thinnest film material consistent with strength and optical density. Low density polyethylene of thickness about .001", similar to the material gardeners use to prevent weed growth in their gardens, is functionally and economically an appropriate sheeting material. Under conditions of possible turbulence, such as ocean fronts, or where there are sharp rocks on the bottom it could be good practice to use a reinforced or otherwise tougher material.

The width of the sheets would normally be from five to twenty feet. To cover larger areas, multiple sheets would be laid side by side. The length of the sheets is limited only by the ability to handle and install.

The hold down means can be almost anything ranging from aggregate or rebar encased in tubes attached to or a part of the plastic film, to a film adherent material itself heavy or with sand or metal

inclusions (4). It is only important that the weight of the hold down means (4) be adequate to hold the sheet (5) in place and to direct the decomposition gases (11) to the exit ports (6 - 9).

The hold down means (4) would be longitudinally spaced from one to five feet apart with two to three feet appropriate under most conditions. The hold down means at the ends of the strips (3) should be particularly stiff to facilitate installation and removal; 3/8inch rebar encased in plastic tubes attached to the plastic sheet is appropriate; also plastic rope (10) attached to the stiff end bars can serve as handles to facilitate installation and removal.

The plastic film (5) will take a convex configuration (12) between the hold down means (similar to a Quonset hut) both as a result of its less than one specific gravity and the uplifting effects of the gases of decomposition (11). At the top of this "hut" there are ports of design (6, 7, 8, or 9) cut in the plastic film laterally spaced from one to three feet. Since these ports are at the top of the "hut" they are above the substrate by several inches and although some sun light may get through the ports it is transient and is therefore inadequate to encourage plant growth.

The shape of these ports may be anything from (6) a simple longitudinal slit of length 2 or more inches, (7) a slit oriented at an angle up to ninety degrees from longitudinal (As the slit orientation approaches lateral, its length should be decreased so as to limit the sunlight incidence on to the substrate.), (8) a small hole (1/8th inch would be about right.), or (9) a configuration similar to a "C" where the sheet material acts as a valve flap. The longitudinal slit (6) is favored as being the least costly to manufacture and it does the job.

One limitation on the useful life of this type of barrier is the effect of sediment accumulation. Using a plastic material with a specific gravity of less that one results in the plastic sheet rising between the hold down means into a convex configuration (12). As sediment drops to the bottom

of the lake, it tends to slide down the surface of the plastic and accumulate at the hold down means, having then no detrimental effect on the gas emitting functions of the plastic sheet. Unless there is very significant sediment accumulation, weed growth will be discouraged and fragile because of the inability of the weeds to establish strong root systems.

One can even conceive that in the case of irrigation or drainage ditches (Figure 2), the plastic film (5) is of width adequate to span the ditch and of whatever length the installer feels is appropriate. At intervals of about three feet along the length of the strip (5) transverse tubes (4) are attached to the strip or integral with the strip. These tubes are filled with the appropriate aggregate at the time of installation. This hold down means could be sand, cement, or gravel. The cement has the advantage, after hardening, of providing a rigid structure fitting exactly the contours of the ditch. Under some circumstances it would be appropriate for the sheet (5) to be reinforced plastic.

When plastic tubes are utilized to secure the hold down means (4), the attachment of the plastic sheets (5) to the hold down means tubing can be accomplished by a variety of means including gluing, welding, clipping or stitching. When rebar is to be used as the hold down means, it can be coated or incased to minimize the potential for rusting.

One method of installation of this weed suppressor in a lake would be as follows: The suppressor is supplied to the site accordion pleated and loaded on to the stern of a row boat. The free end is pulled off and held with the attached rope handle (10). The boat is then rowed out and the pleated material allowed to peal off. When fully dispensed, the suppressor is pulled reasonably taunt and the end released to settle to the bottom. Additional strips can be positioned next to one another with some overlapping.